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18 August 1944

R. Bacher

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PER DOC REVIEW JAN. 1973

G. B. Kistiakowsky

Explosives Lenses

JAN 14, 1981

The study of the performance of explosives lenses is sufficiently difficult to justify considerable expenditure of effort in the development of new methods for the purpose. At present we have substantially only two methods for such study here at the Site. One is the "Terminal Observation", which is suitable for low power two-dimensional lens using loose explosive but possibly may be extended to others. The other is the study of the implosion ~~difficulties~~, which, as you undoubtedly know, is complicated by other factors, the understanding of which is not complete.

At ERL, Bruceton, a very satisfactory rotating drum slit camera exists and will be used intensively for the study of all-cast lenses in two and three dimensions.

We all feel that additional devices at the Site would be more than desirable, particularly later when the lens study gets into its full stride.

For this purpose, I have already asked MacDougall at Bruceton to order for us a Chinese copy of their camera, and he informs me that the order has been placed. The camera may be expected at the Site sometime in November. However, two other suggestions have been made both of which appear to me much more promising that the presently available rotating prism camera, which ~~supplies~~ a number of optical disadvantages.

One proposal is contained in the attached memorandum of Mr. Bainbridge, the other is a proposal of Mr. Alvarez to obtain high speed rotating image by the use of a series of rotating totally reflecting prisms, each of which mutliplies the speed of rotation by a factor of two.

The consideration of the relative advantages of these methods and steps to be taken to provide the best instruments fall properly under your jurisdiction, and I am requesting you to consider the attached memorandum, to discuss with Alvarez his method, on which tests are being made by Julian Mack, and then to advise us of your decision. I may add that the Bruceton camera has a linear speed of the image of 260 meters per second and, by the use of a fine slit, has a resolving power of $\frac{1}{4}$ μsec. The light gathering power of the present system is such that the lens has to be stopped to 1/10 its maximum aperture when studying detonation in high explosives.

G. B. Kistiakowsky

GBK:he
Copies to: Alvarez
Bainbridge

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